

CLAIMS

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1. A variable valve gear comprising at least:

a casing; a cam shaft (1);

a control cam (2) mounted on said cam shaft (1);

a valve (4);

a valve actuator (5) for displacing said valve (4);

a roller (6);

a control shaft (7) rotatable about an axis (9) of said casing;

characterized in that:

the roller couples the control cam and the valve actuator and the control shaft, the control cam displaces the roller, and the roller, supported on the control shaft, displaces the valve actuator and the valve at a variable stroke depending on the angular displacement of the control shaft,

thereby a simple, light, compact, precise, low friction, capable for high revs, easy to adjust and easy to control continuously variable valve lift system, with acceptably small valve clearance for all available valve lifts, can result.

2. As in claim 1 characterized in that:

the roller comprises pins and rings in order to reduce or eliminate the sliding of the roller on the members it couples.

3. As in claim 1 characterized in that:

the roller is cylindrical or spherical or barrel shaped or in general is a solid of revolution or comprises solids of revolution.

4. As in claim 1 characterized in that:

the roller is a free roller trapped among the control cam, the control shaft and the valve actuator.

5. As in claim 1 characterized in that:

the roller is only partially cylindrical or it is a fraction of a solid of revolution.

6. As in claim 1 characterized in that:

the roller is in direct contact to the control cam and to the control shaft and to the valve actuator.

7. As in claim 1 characterized in that:

the roller is a roller bearing rolling directly on some or all of the members it couples.

8. As in claim 1 characterized in that:

the axis of rotation of the control shaft and the axis of the roller are substantially offset to each other when, with the valve closed, the roller is in touch to the basic circle of the control cam, the roller is supported along a surface of the control shaft which comprises a lost motion initial part followed by an activation part, said lost motion initial part is substantially a surface of revolution with axis substantially coinciding the axis of rotation of the control shaft,

thereby a variable lift / variable duration / variable timing system results.

9. As in claim 1 characterized in that:

the rotation axis of the control shaft substantially coincides to the axis of the roller when, with the valve closed, the roller is in touch to the basic circle of the control cam,

thereby a variable valve lift with substantially constant duration, timing and clearance can result.

10. As in claim 1 characterized in that:

there is a lever swivelably coupled, at one end, to the valve actuator, and the lever holds, at its other end, the roller.

11. As in claim 1 characterized in that:

the profile of the contact surface between the control shaft and the roller, and the profile of the contact surface between the valve actuator and the roller are properly selected to provide the desirable range of valve lifts with acceptably small valve clearance.

12. As in claim 1 characterized in that:

the profile of the contact surface between the control shaft and the roller, and the profile of the contact surface between the valve actuator and the roller are properly selected to provide valve lifts from substantially zero to a maximum, with acceptably small valve clearance,

thereby a throttless system can result, as well as a system for deactivating some cylinders.

13. As in claim 1 characterized in that:

the profile of the contact surface between the control shaft and the roller, and the profile of the contact surface between the valve actuator and the roller are plane or cylindrical.

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14. As in claim 1 characterized in that the roller is displaced by said control cam indirectly, through a linkage, thereby a high precision system can result, suitable for arrangements like the side cam engines.

15. A variable valve gear, comprising:

a cam shaft (1);

a control cam (2) mounted on said cam shaft (1);

a cam follower (33);

a valve (4);

a valve displacing device (5) for displacing said valve (4);

a valve lever (61) swivelably coupled to said valve displacing device (5);

a control lever (8) rotatable about an axis (9) and swivelably coupled to said valve lever (61) at a swivel joint (11);

an adjusting device for displacing said axis (9) along a path; the stroke of said valve (4) is variable according to the displacement of said axis (9) along said path;

characterized in that:

the swivel joint (11) between said valve lever (61) and said control lever (8) is displaced by said control cam (2) indirectly through a linkage;

thereby a high precision system can result, especially suitable for arrangements like the side cam engines.